

REMARKS

Currently, claims 2-4, 7, 8, 10-13, 15-17, 19, 21, and 22 are pending in the present application, including independent claim 21 and withdrawn claims 15-17. For instance, independent claim 21 is directed to a composite that includes a polyacetal component and a thermoplastic polyamide elastomer component. More specifically, these two components are immediately adjacent to one another.

The polyacetal component includes polyacetal and at least one modifier selected from the group consisting of thermoplastic polyurethane elastomer, methyl methacrylate-butadiene-styrene core-shell elastomer, methyl methacrylate-acrylate core-shell elastomer, polycarbonate, styrene-acrylonitrile copolymer, and acrylate-styrene-acrylonitrile copolymer compounded material. The thermoplastic polyamide elastomer component consists essentially of at least one thermoplastic polyamide elastomer. The thermoplastic polyamide elastomer is a copolyamide consisting of the repeat structural units of the formulae I and II or of the formulae I and III or of the formulae I, II, and III, which have been linked to one another via ester bonds and/or amide bonds



where R^1 , R^2 , and R^3 , independently of one another, are alkylene or cycloalkylene radicals,

where R^4 and R^5 , independently of one another, are alkylene, cycloalkylene, or arylene radicals,

m and q, independently of one another, are 0 or 1, and

n, o, and p, independently of one another, are whole numbers at least equal to 1.

The polyacetal component and the thermoplastic polyamide elastomer component have been bonded adhesively or cohesively to one another via the process as outlined in the claim. The tensile bond strength between the two components is at least 0.5 N/mm².

In the Office Action, independent claim 21 was rejected under 35 U.S.C. §103(a) as being unpatentable over Pfleger (U.S. Patent No. 5,792,532) in view of Memon, et al. (U.S. Patent No. 5,792,532). Applicants respectfully submit that the cited references, taken either alone or in any proper combination, fail to disclose or suggest elements of claim 21. For instance, the combined references fail to disclose or suggest a composite comprising a polyacetal component and a thermoplastic polyamide elastomer component immediately adjacent to one another, as is found in independent claim 21.

Pfleger is directed to polymer tubing having a beneficial corrugation geometry. The tubing is produced by co-extrusion of a polymer pipe and subsequent formation of the corrugation (col. 1, ll. 5-22). The polymer tubing is advantageously constituted from polymer layers of different functions, including an inner layer that is inert in respect to the medium being conducted, an intermediate layer that is resistant to pressure and mechanical effects, and a very soft polymer outer layer for noise dampening. This outer layer can be a thermoplastic elastomer polyamide. (Col. 3, ll. 43-54.)

As pointed out in the Office Action, claim 22 of Pfleger states that the inner layer can consist essentially of a homo- or copolyacetal, or a mixture or blend thereof. This is the only mention of the possible utilization of a polyacetal found in the entire reference –

there is no discussion of such an embodiment in the written description of the application. This claim depends from claim 9, in which the polymer tubing consists of at least one inner layer, which is inert in respect to a conveyed medium, and a second layer outside the inner layer, which second layer is resistant to pressure and mechanical effects. Thus, the polymer tubing of claim 22 of Pfleger includes an inner layer of a homo- or copolyacetal, or a mixture or blend thereof, and a second adjacent layer that is a pressure resistant layer. According to Pfleger, the layer resistant to bursting pressure consists of polyamides, with polyamide 6, polyamide 66, and polyamide 12 specifically mentioned (col. 4, ll. 1-8). These materials, however, are not elastomers, as are found in independent claim 21 of the captioned application.

Claim 22 of Pfleger calls for a layer external to the polyacetal layer that is resistant to both pressure and mechanical effects. Representative materials are polyamide 6, polyamide 66 and polyamide 12, which are not elastomers. The tubing of Pfleger can include a very soft polymer outer layer external to the pressure resistant layer for noise damping. This soft polymer can be a thermoplastic elastomer polyamide (col. 3, ll. 49-54). This is a different layer than the pressure resistant layer, however, and is formed of different materials. The pressure resistant layer, which is adjacent to the polyacetal layer of claim 22 of Pfleger, can be formed of a polyamide, such as nylon 6, but it is not formed of a thermoplastic polyamide elastomer, as is the component found immediately adjacent to the polyacetal component of pending claim 21.

Memon, et al. discloses a stabilizing toughening component of a stabilized core-shell rubber-elastic graft copolymer composed of a rubber-elastic polybutadiene core, a hard graft shell composed of styrene and PMMA, and special stabilization formulation

(col. 2, ll. 18-26). The stabilizing component is useful in polyacetal (col. 2, ll. 52-65).

Memon, et al. does not cure the failings of Pfleger, however. Specifically, Memon, et al. also fails to disclose or suggest a composite including a polyacetal component and a thermoplastic polyamide elastomer component immediately adjacent to the polyacetal component, as is found in independent claim 21.

For at least these reasons, Applicants respectfully request withdrawal of the rejection.

Independent claim 21 has been amended to include the limitations of dependent claim 9. In the Office Action, claim 9 was rejected under 35 U.S.C. §103(a) as being unpatentable over Pfleger in view of Memon, et al. and further in view of Tanaka, et al. (U.S. Patent No. 4,376,856).

Tanaka, et al. discloses a segmented polyether-ester amide and process for the preparation thereof (col. 1, ll. 7-9). The materials are disclosed as having excellent impact resistance and elasticity (col. 1, ll. 52-55). For instance, they have a Shore D hardness of around 50 (see Table 1, Table 4, Table 7, Example 4), and are understood to be elastomers.

The polyamides of the pressure resistant layer of Pfleger, in contrast, are not elastomers, as discussed above. For instance, Nylon 6 has a hardness of R94, and Nylon 66 has a hardness of R120 (see, e.g., the information provided attached hereto, published by PLASCO, Inc.). These are very different materials with different characteristics. Applicants respectfully submit that proper rationale does not exist for utilizing the soft, elastomeric copolymers of Tanaka, et al. as the pressure resistant

layer of Pfleger, which is the layer adjacent the inner polyacetal layer of claim 22 of Pfleger.

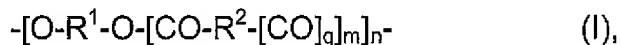
Accordingly, Applicant's submit that independent claim 21 patentably defines over Pfleger in view of Memon, et al. and further in view of Tanaka, et al., and request withdrawal of the rejection.

In the Office Action, dependent claim 9 was also rejected under 35 U.S.C §103(a) as being unpatentable over Mutsuda (U.S. Patent No. 6,517,949) in view of Mermon, et al. and further in view of Tanaka, et al.

Mutsuda discloses a polyacetal composite that includes a polymer unit (A) composed of a polyacetal resin and a polymer unit (B) composed of a thermoplastic resin or elastomer having an acidic group that can be, e.g., a carboxy group or a carboxylic anhydride group (col. 1, ll. 51-58). For instance, the polymer unit (B) can be an acid-modified polystyrene or an acid-modified NBR (col. 1, ll. 62-65). Specifically, the acidic group may be contained in any moiety of a principle chain and side chain in the molecular structure of the thermoplastic resin or elastomer (col. 2, ll. 61-66). The thermoplastic resin can include polyamides (col. 3, ll. 19), but the resin must include the required acidic groups. Two techniques are outlined for introducing an acidic group into the thermoplastic resin or elastomer including copolymerization between a major monomer component and a comonomer or reacting a polymer with a compound that includes both a functional group reactive with a functional group of the polymer and also an acidic group.

In contrast, the thermoplastic polyamide elastomer component of the composites of independent claim 21 have no acidic group. This component consists of the repeat

structural units of the formulae I and II or of the formulae I and III or of the formulae I, II, and III, which have been linked to one another via ester bonds and/or amide bonds



where R^1 , R^2 , and R^3 , independently of one another, are alkylene or cycloalkylene radicals,

where R^4 and R^5 , independently of one another, are alkylene, cycloalkylene, or arylene radicals,

m and q, independently of one another, are 0 or 1, and

n, o, and p, independently of one another, are whole numbers at least equal to 1.

In the Office Action, it was stated that it would be obvious to use conventional polyetheramide elastomers, e.g., as taught by Tanaka, et al. as the polyether amide elastomer in the composite taught by Matsuda to arrive at a composite having desirable qualities. However, Applicant's respectfully submit that if one were to utilize an elastomeric polymer as taught by Tanaka, et al. in forming the composites according to Matsuda, that elastomeric polymer must still have or be treated to have an acidic group, as is *required* by Matsuda, in which case the polymer differs from the elastomeric component of the pending claims.

In order to combine the references as suggested to arrive at the limitations of pending claim 21, one of ordinary skill in the art would be required to ignore the core teachings of Matsuda in which the thermoplastic resin or elastomer includes an acidic group. Applicants respectfully submit that this is improper, as the teachings of the prior

art must be considered as a whole, including portions of the prior art that teach away from the claimed invention.

Additionally, Applicants submit that omission of an element (e.g., the acidic group from the elastomeric component) and retention of its function (bonding between the polyacetal and the elastomeric component) is an indicia of unobviousness.

For at least these reasons, Applicants respectfully submit that independent claim 21 patentably defines over Mutsuda in view of Mermon, et al. and further in view of Tanaka, et al. and request withdrawal of the rejection.

Applicants also respectfully submit that for at least the reasons indicated above relating to the independent claim, the pending dependent claims patentably define over the references cited. However, Applicants also note that the patentability of the dependent claims certainly does not hinge on the patentability of the independent claim. In particular, it is believed that some or all of these claims may possess features that are independently patentable, regardless of the patentability of the independent claim.

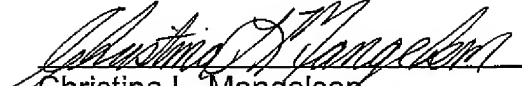
It is believed that the present application is in complete condition for allowance and favorable action, therefore, is respectfully requested. The Examiner is invited and encouraged to telephone the undersigned, however, should any issues remain after consideration of this Amendment.

Please charge any fees required by this Amendment to Deposit Account No. 04-1403.

Appl. No. 10/584,745
Amdt. dated Aug. 23, 2010
Reply to Office Action of June 22, 2010

Respectfully submitted,

DORITY & MANNING, P.A.


Christina L. Mangelsen
Registration No. 50,244

P.O. Box 1449
Greenville, SC 29602-1449
Phone: (864) 271-1592
Facsimile: (864) 233-7342

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HARDNESS CAN BE CONSIDERED IN SEVERAL WAYS. A ROCKWELL NUMBER IS DIRECTLY RELATED TO THE RESISTANCE OF A RIGID MATERIAL TO PENETRATION BY A STEEL BALL. SOFT PLASTICS AND RUBBERS ARE TESTED FOR RESISTANCE TO PENETRATION BY THE SHORE HARDNESS METHOD. HERE IS A GENERAL COMPARISON BETWEEN THE MOST COMMON SCALES OF HARDNESS:

HERE ARE SOME RELATIVE RANKINGS OF HARDNESS FOR SOME COMMON THERMOPLASTICS:

http://www.plasco-corp.com/plasco/html/tech_topics/materials_archive/hardness.mat_archi... 8/4/2010

	A221	POULENC	R100
NY66 / 40%CF	NY23001 BK	C FERRO	(R) R120

(S) = SHORE SCALE (R) = ROCKWELL SCALE

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